

Collaborative Waste Management for SDG 12 in Banyumas Regency: A Case Study of the 'Sumpah Beruang' Program

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Abstract

This research examines the collaborative efforts between the government and the local community in managing waste in Banyumas Regency, Indonesia, through the 'Sumpah Beruang' program, which stands for Transforming Waste into Wealth. The study investigates how this program, initiated by the local government in collaboration with Community Self-Reliance Groups (KSM), has contributed to achieving Sustainable Development Goal 12 (Responsible Consumption and Production) through the reduction of waste and the promotion of recycling practices. Employing a qualitative method, this study analyses data gathered from government reports, interviews with key stakeholders, and relevant literature. Findings show that the 'Sumpah Beruang' program has successfully engaged local communities in waste management processes, turning waste into valuable resources such as compost and recycled materials. However, challenges remain in scaling up the initiative and addressing the structural issues of waste segregation and collection. The research concludes that while the program significantly supports SDG 12, a more robust policy framework and increased community participation are required to ensure its long-term sustainability and broader impact.

Keywords: waste management, collaborative governance, SDG 12, Banyumas, Sumpah Beruang

1. Introduction

With modernization and population growth, the amount of waste generated has grown significantly, causing adverse environmental impacts. Waste is an inseparable part of daily human activities, comprising both organic and inorganic materials. Waste can be defined as solid materials or objects no longer used by humans, or remnants of materials from human activities that are discarded [1]. According to the World Health Organization (WHO), waste refers to materials originating from human activities that have lost their utility, whether due to being unwanted, unused, or intentionally disposed of [2]. Similarly, waste can be described as residual materials left after essential parts have been extracted, processed, or rendered valueless from a socioeconomic perspective, while simultaneously posing potential risks to environmental sustainability [3].

The issue of waste management has become a global concern, especially in regions experiencing rapid population growth and increasing urbanization. Banyumas Regency, with a population exceeding

1.8 million people, faces significant challenges in managing the waste produced daily. In 2023, Banyumas generated an estimated 541.8 tons of waste each day, resulting in a total annual waste generation of approximately 197,758 tons [4]. This growing volume of waste is largely mismanaged, contributing to various environmental issues such as landfill overflow, contamination of soil and groundwater, and air pollution [5]. Over the years, the limited capacity of landfills in Banyumas has led to the closure of multiple landfill sites, such as in Gunung Tugel and Kaliori, due to public protests over environmental degradation and health risks linked to waste accumulation and improper management [6]. These closures underscore the urgent need for sustainable and integrated waste management solutions [7].

A study by Nur Ilhami (2023) highlighted several critical issues in the waste management policies of Banyumas Regency. In 2021, the volume of waste reached 1,790 m³ per day, up from 1,656 m³ in 2020, with approximately 22,198 hectares still not covered by waste management services [10]. Factors inhibiting effective waste management include inadequate infrastructure, limited budgets, and low public awareness. Efforts by the Banyumas Environmental Office (DLH) include improving facilities and infrastructure, as well as conducting socialization programs to educate the public on the importance of waste management [10].

The Sumpah Beruang program is one such initiative that seeks to address these challenges. This innovative program, introduced by the Banyumas regional government, focuses on waste reduction at the source by encouraging households to sort their waste into organic and inorganic categories [5]. The sorted waste is then processed into economically valuable products, such as compost and recycled materials [6]. The initiative aligns with Indonesia's broader commitment to achieving the Sustainable Development Goals (SDGs), specifically SDG 12, which emphasizes sustainable consumption and production patterns [8]. Additionally, the program has leveraged the involvement of Community Self-Reliance Groups (KSM) in waste collection and processing, further enhancing the community-driven aspect of the initiative [9].

Collaborative governance offers valuable insights into how multi-stakeholder initiatives, like the Sumpah Beruang program, can be optimized for greater effectiveness. Stakeholder engagement is essential; by involving a wide array of stakeholders—including local communities, government entities, non-governmental organizations (NGOs), and private sector actors—the program can ensure accountability, foster inclusivity, and drive long-term sustainability [11]. This type of engagement is particularly important in environmental management, where the diverse interests of various stakeholders must be aligned to achieve shared goals [12].

Finally, systematic evaluation and contextual learning are crucial components of the program's success. Regular assessments allow stakeholders to measure the effectiveness of the initiatives, identify

areas for improvement, and make adjustments as needed [9]. By continuously learning from the program's outcomes and incorporating stakeholder feedback, the Sumpah Beruang initiative can refine its approach and ensure that it remains sustainable in the long term [13].

By integrating these principles of collaborative governance, the Sumpah Beruang program has the potential to serve as a model for other regions facing similar waste management challenges. This holistic approach not only addresses the environmental aspects of waste management but also enhances social and economic outcomes by promoting community engagement and economic empowerment [14].

2. Method

This study uses a qualitative approach with a case study design. Data were collected through interviews with key stakeholders, including the Head of the Banyumas Regency Environmental Office, the Chairperson of the KSM "Mekarsari" in Karangcegak Village, the Chairperson of KSM "Galuh" in Wangon District, the Chairperson of DPD Komnas PPLH Banyumas Regency, and community members participating in the Sumpah Beruang program. Secondary data were also collected from official reports and documents related to this program.

3. Result and Discussion

3.1 Collaboration between the Government, KSM, and the Community in the Sumpah Beruang Program

3.1.1 Role of Local Government and the Environment Agency (DLH) Banyumas Regency

The government's initiative through the Sumpah Beruang program in Banyumas has demonstrated accountability by reducing waste at the source by nearly 70% and enhancing community participation [5]. The Environment Agency (DLH) of Banyumas Regency leads the Sumpah Beruang program, focusing on waste reduction and sustainable management. Widodo Sugiri, ST, Head of DLH Banyumas, highlighted that key innovations like the Jeknyong and Salinmas apps have been instrumental in assisting households with waste sorting, fostering community involvement, and improving operational efficiency (Interview, 30 September 2024) [15]. These digital tools are part of a broader strategy to promote responsible consumption and production, aligning with Sustainable Development Goal (SDG) 12 [8].

Additionally, DLH has established Zero Waste-based Integrated Waste Processing Sites (TPST) where waste is converted into products such as compost and Refuse-Derived Fuel (RDF), reducing dependency on traditional landfill systems [7]. However, Widodo Sugiri emphasized the need for expanded public education campaigns to further enhance program effectiveness [15].

3.1.2 Role of Community Self-Reliance Groups (KSM)

Community Self-Reliance Groups (KSM), including Mekarsari in Desa Karangcegak and Galuh in Kecamatan Wangon, are integral to the local implementation of the Sumpah Beruang program. They

manage waste collection, sorting, and processing while serving as intermediaries between the government and community [4]. Sidiq Firmansyah, Chair of KSM Mekarsari, shared that their group focuses on educating residents about proper waste practices, although participation rates in waste sorting remain a challenge due to the perception that waste management is solely the government or KSM's responsibility (Interview, 1 October 2024) [16]. Similarly, Galuh Alfindo, Chair of KSM Galuh, pointed out the need for additional facilities and policy support to sustain community engagement and operational capacity (Interview, 12 October 2024) [17]. Budiman [2] underscores that community-driven initiatives are most effective when bolstered by strong institutional frameworks and local government support.

3.1.3 Role of Non-Governmental Organizations (NGOs)

Non-Governmental Organizations (NGOs), such as the National Commission for Environmental Protection (Komnas PPLH) Banyumas, play a critical role in monitoring environmental policies and educating the public on sustainable waste management [4]. Sunaryo, S.Pd, Chair of Komnas PPLH, stressed the importance of collaboration between the government, community, and private sector to strengthen the impact of programs like Sumpah Beruang (Interview, 2 October 2024) [18]. However, as noted by Hadiwiyo [3], limited resources often restrict NGO advocacy and outreach efforts. Emerson and Nabatchi's framework for collaborative governance supports this perspective, advocating for shared objectives and institutional support among all stakeholders [12][14]. Through these multi-stakeholder collaborations, the Sumpah Beruang program has shown significant potential to reduce waste and foster sustainable practices, making Banyumas Regency a model for environmental governance.

3.2 Contribution of the Sumpah Beruang Program to SDG 12

3.2.2 Waste Reduction at the Source

The government's initiative through the Sumpah Beruang program in Banyumas has demonstrated accountability by reducing waste at the source by nearly 70% and enhancing community participation. The Environment Agency (DLH) of Banyumas Regency leads the Sumpah Beruang program, focusing on waste reduction and sustainable management. DLH has introduced key innovations, like the Jeknyong and Salinmas apps, to assist households with waste sorting [4,5]. To boost community participation, the government offers incentives, particularly for sorting inorganic waste with economic value, though further public education is needed [5,6]. Additionally, DLH has implemented Zero Waste-based sites at Integrated Waste Processing Sites (TPST), where waste is converted into products like compost and Refuse-Derived Fuel (RDF), reducing dependence on traditional disposal systems [7].

3.2.3 Raising Public Awareness

Through this program, the community is expected to actively participate in waste management and become more aware of the environmental impact of their consumption behavior. The education and outreach conducted by KSM and DLH focus on the importance of waste sorting and reducing the use of single-use materials, in line with the SDG 12 goal of ensuring responsible consumption patterns [8].

KSM "Mekarsari" has carried out various educational activities at the village level to raise awareness about the importance of proper waste management [9]. Although challenges remain in terms of low public participation, these efforts demonstrate that the Sumpah Beruang program is contributing to behavioral changes that support the principles of SDG 12.

3.3 Challenges in the Sumpah Beruang Program

The Sumpah Beruang program can be analyzed through the lens of Collaborative Governance theory. This theory emphasizes the importance of collaboration among the government, community, and private sector in decision-making and the implementation of public policies. Effective collaboration must involve the community as active citizens engaged in the process, rather than merely as consumers of information or services [11,12].

3.3.1 KSM as Community-Based Organizations, but Operating as Individual-Owned Businesses

One of the key challenges facing the Sumpah Beruang program is that KSM, intended to be community-driven, often operate as individual-owned businesses [11,13]. While these groups are meant to reflect collective ownership and participation, many are controlled by a small number of individuals, undermining broader community engagement and contradicting the collaborative governance model the program aims to establish [12,14].

3.3.2 Lack of Collaboration Between District and Village Governments

One of the main challenges faced by KSM in the Sumpah Beruang program is the lack of collaboration between the district and village governments in waste management [10,15]. The district government should provide more concrete and sustainable support to help villages manage waste independently.

3.3.3 The Community as Consumers, Not Citizens

Another significant challenge faced by the Sumpah Beruang program is the position of the community, which often acts more as consumers rather than as active citizens [12]. The community tends to view waste management as the responsibility of the government and KSM, without feeling they have a role or responsibility in the process [10,16].

3.3.4 Limitations of KSM's Capacity

The limitations of KSM capacity present a significant challenge in waste management. Many KSM members are untrained and have other jobs, which prevents them from focusing on waste management [13].

3.3.5 Limited Infrastructure and Facilities

Limited infrastructure at the village level poses a significant barrier to the success of the Sumpah Beruang program. Without adequate processing facilities, KSM cannot manage waste effectively. This limitation not only hampers the waste sorting process but also leads to new problems, such as environmental pollution and an increasing amount of unmanaged waste [17,18].

3.3.6 Minimal Monitoring of KSM's Budget

Furthermore, the minimal monitoring and evaluation of KSM's budget utilization present a significant challenge. The government only facilitates KSM at the initial stage of the program but does not conduct ongoing monitoring [20,21].

3.4 Recommendations to Strengthen the Implementation of the Sumpah Beruang Program

3.4.1 Revitalizing Community Ownership in KSMs

To strengthen the Sumpah Beruang program and address the issue of KSMs functioning as individually owned rather than community-driven organizations, it is crucial to promote collective ownership through democratic decision-making, ensuring all members participate actively. Building trust through transparent financial reporting and regular audits can enhance accountability and reduce conflicts [5]. Clear governance structures should be established with rotating leadership roles to prevent power concentration, while external facilitators can help mediate conflicts and encourage inclusiveness [11,12]. Community education on collective ownership and waste management can empower members to take active roles, while partnerships with the private sector should be managed carefully to support community goals [19]. Regular evaluation and feedback mechanisms will help adapt the program to evolving community needs, ensuring long-term sustainability and effectiveness in waste management efforts in Banyumas Regency [5,9].

3.4.2 Enhancing Government Collaboration

One of the initial steps that need to be taken is to strengthen collaboration between the district government and village governments. The district government must provide more concrete and sustainable support to assist villages in managing waste independently. This can be achieved by offering systematic training focused on waste management, where members of KSMs and village officials gain an in-depth understanding of effective management strategies [5,10]. Additionally, the district government needs to ensure that villages have better access to resources, such as funding, facilities, and waste

management equipment, to enhance their operational capacity [4,9]. Establishing effective communication channels between the district and village governments is crucial so that information related to policies, resources, and best practices in waste management can be conveyed smoothly [11,13].

3.4.3 Community Awareness Campaigns

One of the key factors for the success of the Sumpah Beruang program in achieving SDG 12 is changing community behaviors in waste management. Currently, public awareness regarding waste sorting and recycling practices is still low, requiring more massive and targeted educational efforts [8,9]. The government and Community Self-Reliance Groups (KSM) need to expand the scope of socialization, especially in rural areas where participation is still lacking [7,20]. Education should include practical aspects such as how to sort organic and inorganic waste, as well as the environmental impact of improper waste management [21]. Education methods must be tailored to local needs, such as community-based campaigns, involvement of local leaders, and using local media like community radio and digital platforms [10,18]. Religious leaders, teachers, and community leaders can also be used as agents of change to amplify the impact of this education [16,17]. By increasing the public's understanding of the importance of sorting waste at the source, more responsible consumption behaviors can be fostered, aligning with SDG 12 [8,10].

3.4.4 Developing Adequate Waste Management Infrastructure and Facilities at the Village Level

The lack of waste management infrastructure at the village level is a major challenge to the success of the Sumpah Beruang program. To achieve SDG 12, the government must make larger investments in developing infrastructure that supports community-based waste management [7]. Necessary facilities include waste sorting sites, tools for processing organic and inorganic waste, and adequate waste transport vehicles for each village [5]. Villages that do not yet have adequate facilities should be prioritized in infrastructure budget allocation [9]. Additionally, waste management can be integrated with Village-Owned Enterprises (BUMDes), where villages can independently establish waste management units and collaborate with KSM [5,6]. With adequate infrastructure, villages will have greater capacity to manage waste independently, reducing reliance on landfills and creating added value through recycling and compost production [19,20]. This will encourage villages to manage their consumption and production more sustainably, in line with SDG 12 targets [8].

3.4.5 Village-Level Waste Management Policies and Empowering KSM as Local Drivers

KSM plays an important role as the main driver in implementing the Sumpah Beruang program, but the challenges faced by KSM include the heavy burden of waste management without sufficient policy support [10]. The local government needs to establish policies that require village or sub-district

governments to take direct responsibility for waste management in their areas [6]. With such a policy, the village or sub-district will be responsible for sorting and managing waste locally, while KSM can focus on processing and utilizing waste [9]. KSM empowerment must be strengthened through adequate training and logistical support, enabling them to operate more efficiently and handle large waste volumes [19,21]. This support could also include technical assistance to improve KSM's capabilities in utilizing waste processing technologies and developing high-value recycled products [20]. With supportive policies and the empowerment of KSM, local waste management can become more integrated and effective, supporting the long-term achievement of SDG 12 [5,8].

3.4.6 Budget Monitoring

To ensure effective budget utilization, it is important for the government to conduct regular and systematic monitoring of KSM budget usage [5,9]. This includes periodic evaluations of budget allocation and usage to ensure that funds are used wisely and targeted effectively [4]. Additionally, promoting transparency in budget management will enhance KSM's accountability and build public trust in the program [11,14]. With oversight and consistent support, KSM will find it easier to ensure that the allocated budget is used effectively to achieve the goals of the waste management program [9,15].

4. Conclusion

This study concludes that the Sumpah Beruang program in Banyumas Regency has significantly contributed to supporting the achievement of SDG 12 (Responsible Consumption and Production). The program encourages community participation in waste sorting at the source, successfully reducing waste volume by up to 70% and creating added value through the recycling of organic and inorganic waste. The collaboration between the local government, KSM, NGOs, and the community has proven to be the key to the successful implementation of this program

However, if these challenges can be addressed through strategic measures that revitalizing community ownership in KSMs, enhance community engagement as active citizens, strengthen KSM capacities, and ensure more concrete government support in the form of training and infrastructure investment, the Sumpah Beruang program holds real potential to transform waste into "money." The utilization of waste through processing and recycling can provide economic value to the community and create new job opportunities in the waste management sector. Furthermore, this program aligns with Sustainable Development Goals (SDGs) 12, which emphasizes the importance of responsible production and consumption, as well as sustainable natural resource management.

By implementing these recommendations, the Sumpah Beruang program can become a model for better and more sustainable waste management, positively impacting environmental health and

community welfare. Harmonious collaboration among all stakeholders will be key to creating a more environmentally conscious society, responsible for waste management, and capable of leveraging waste as a source of income. Thus, the success of this program will not only improve the quality of the environment but also contribute to the achievement of SDG 12 in the pursuit of sustainable and inclusive development.

5. Conflict of Interest

The authors declare that there is no conflict of interest related to the writing or publication of this article.

6. Acknowledgement

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